REMARKS:

1) Entry and consideration of this Response After Final are respectfully requested. This Response does not raise any new issues that would require further search or consideration, but rather merely addresses issues already raised in the Final Office Action. By addressing those issues, this Response aims to place the application into allowable condition, or simplify the issues remaining for appeal if an Appeal should become necessary. Also, the present amendment does not increase the total number of claims. Therefore, entry and consideration of this Response After Final without an RCE are appropriate, and are respectfully requested.

2) Referring to item 10) of the Office Action Summary, please indicate the acceptance of the original drawings filed on January 9, 2006.

3) The claims have been amended as follows.

Independent claim 8 has been amended to make clear that the position or orientation of the milling tool along a respective tool path relative to a respective collision contour is monitored in an automated comparison of the respective tool path with the respective collision contour. This is a feature of the invention already considered and addressed by the Examiner (see section 8 on pages 4 and 5 of the Final Office Action). As noted by the Examiner, this feature of the invention was previously not expressly recited in the claims. However, this feature was

inherently included in the original disclosure of the invention. The specification explains that the position or orientation of the milling tool along the tool path relative to the collision contour of the structural component to be milled is determined by a tool vector (for example see claim 9 and page 4 lines 13 to 17). Also, the motion of the milling tool relative to the workpiece is described by tool coordinates which define the position of a tool reference point, and the motion of this tool reference point is designated as the tool path (page 4 lines 8 to 12). The specification further discloses that the tool path is monitored by a comparison of the tool path and the collision contour, and if the tool path collides with the collision contour then an error message may be generated (page 2 lines 9 to 15, page 3 lines 4 to 7, page 6 lines 17 to 21, page 8 lines 1 to 5). From these disclosures, a person of ordinary skill in the art would readily understand that the comparison of the tool path with the collision contour is an automated comparison carried out in a computer, for example the computerized controller of a CNC milling machine (generally see page 1 line 5 to page 2 line 2, page 4 line 3 to page 5 line 6, and page 8 lines 17 to 25). A person of ordinary skill in the art knows that modern high speed cutting (HSC) milling or high performance cutting (HPC) milling is carried out on a five-axis milling machine with a computerized CNC controller (see page 1 lines 5 to 8, page 8 lines 17 to 25). A person of ordinary skill in the art also readily understands that defining tool coordinates along a tool path by a tool vector is a numerical process carried out in the computerized CNC controller. Similarly, a person of ordinary skill understands

that generating an error message is a computerized electronic process also carried out by a computerized controller. A human operator does not define a tool path and a collision contour in terms of tool coordinates of a tool vector, and does not generate an error message. So, a person of ordinary skill would readily understand that the disclosed inventive method involves automated comparison of the tool path with a collision contour as well as automated generation of an error message. Thus, the amendment of claim 8 does not introduce any new matter.

Independent claim 21 has been amended to clarify steps d) and e), and to incorporate subject matter from prior claim 24. This amendment, which merely editorially clarifies and combines claims, does not introduce any new matter.

Claims 18, 24 and 26 have been canceled.

Claims 19 and 27 have been amended for proper dependency and conformance in view of the cancellation of claims 18 and 26.

New claim 28 has been added, dependent from claim 21, to expressly recite that the comparison in step c) is carried out as an automated comparison. This new claim does not introduce any new matter for the same reasons discussed above in connection with the amendment of claim 8.

Entry and consideration of the claim amendments and the new claims are respectfully requested.

4) Referring to section 3 on page 3 of the Office Action, the new abstract of the disclosure according to the amendment of January 5, 2009 is now repeated in the above amendment section and is also enclosed on "*a separate sheet, apart from any other*

text" as required by the Examiner. It is further submitted that page 11 of the prior Response of January 5, 2009 properly presented an amendment of the abstract in conformance with the rules. 37 CFR 1.121(b)(1) sets forth the requirements for an amendment to delete, replace or add a paragraph of the specification, with an instruction that unambiguously identifies the location to delete one or more paragraphs of the specification, or to add one or more paragraphs. That is exactly how the amendment of the abstract was set forth on page 11 of the prior Response, namely giving an instruction to delete the paragraph at page 12 lines 2 to 12 of the specification, and an instruction to add a new paragraph at page 12 following line 12 of the specification. Further in compliance with 37 CFR 1.121(b)(1), the amendment then included the full text of the added new paragraph without any underlining or strikethrough. Also, the amendment of the abstract commenced on a new separate sheet of the prior Response in accordance with 37 CFR 1.52(b)(4). However, in addition to the clean text of the new added paragraph, the amendment instructions are also required on that sheet according to 37 CFR 1.121.(b)(1). In any event, the Examiner is respectfully requested to accept and enter the amendment of the abstract, and to withdraw any objection in this regard.

5) Referring to sections 4, 5 and 6 on pages 3 and 4 of the Office Action, the rejections of claims 18, 19, 26 and 27 under 35 USC §112, first and second paragraphs, have been obviated by the cancellation of claims 18 and 26 and the amendment of claims 19

and 27. The original specification clearly and fully describes that the collision contour can correspond to an edge of the physical component to be produced (page 7 lines 8 to 11). Also, a person of ordinary skill in the art understands that an edge of a physical component extends along a one-dimensional line in three-dimensional space. Nonetheless, to avoid any possible question of new matter, or lack of enablement, or lack of possession of the claimed invention, or indefiniteness, claims 18 and 26 have simply been canceled. Please withdraw the rejections under 35 USC §112, first and second paragraphs.

6) Referring to section 7 on page 4 of the Office Action, the asserted new matter of the amendment dated January 5, 2009 has now been deleted to avoid any question of asserted new matter. Please withdraw the objection.

7) Referring to section 8 on pages 4 and 5 of the Office Action, the points made by the Examiner are appreciated. Claim 8 has been amended to expressly refer to an automated comparison of the respective tool path with the respective collision contour, and new claim 28 has been added in this regard as well. Also, as will be discussed below, it should be considered that some of the dependent claims recite additional more-concrete limitations that further distinguish the invention over the prior art.

8) Referring to section 2 on pages 2 to 3 of the Office Action, the rejection of claims 8 to 27 as anticipated by US Patent 5,112,966 (Jansen et al.) is respectfully traversed.

Currently amended claim 8 is directed to a milling method in which the position or orientation of the milling tool along a respective tool path relative to a respective collision contour is monitored in an automated comparison of the respective tool path with the respective collision contour.

In comparison to the present invention, the method of Jansen et al. does not involve such an automated comparison. Instead, Jansen et al. disclose a method of computer-aided **human visual determination** of possible tool path interference during an intended milling operation, in which a computer generated image of the relevant portion of the workpiece and a computer generated image of the milling tool **are visually observed** on a computer display screen by a human operator to check whether a collision will occur (see abstract; col. 2 lines 27 to 34; col. 3 lines 3 to 38).

In the system and method according to Jansen et al., there is no automated computerized comparison of the tool path with a collision contour. Instead, the Jansen et al. method is merely a "graphic display method" (col. 2 line 63) in which "computerized images of the portion of the workpiece and the tool" are simply displayed on a computer screen to be "observed" by an operating personnel (col. 2 lines 27 to 34), so that the operating personnel can visually determine whether a collision will occur between the milling tool and the workpiece (col. 3 lines 35 to 38).

Jansen et al. do not disclose automatically monitoring the position or orientation of the milling tool along its tool path

relative to the collision contour by an automatic comparison to determine whether a collision will occur. Instead, the method according to Jansen et al. merely generates and displays computer model images of the workpiece and of the tool, and an operating personnel must visually observe whether a collision will occur. the method of Jansen et al. is thus "dumb" and relies on the human operator to decide whether a collision will occur rather than making such a determination in an automated comparison.

There is also no suggestion by Jansen et al. that a collision contour shall be defined as corresponding to a surface or an edge of the sidewall of the depression being milled, and then using this collision contour in an automated comparison to determine if the collision contour will be damaged by the milling tool. Instead, the method of Jansen et al. is merely a graphic display method in which the computer system models and displays successive images of the complete pertinent portion of the workpiece and of the tool as discussed above.

Dependent claim 9 further recites that the position or orientation of the milling tool along the tool path is determined by a tool vector. In other words, the tool path is defined in terms of this tool vector. Jansen et al. do not disclose defining a tool path in terms of a tool vector, and the Examiner's discussion of the rejection of claim 9 has not addressed this point.

Dependent claim 17 further specifically calls for generating an error message if the milling tool is determined to interfere with the collision contour. Jansen et al. do not disclose and would not have suggested generating an error message. In this

regard, the Examiner has asserted "*When the operator sees an interference or damage and takes action to correct it, that is considered to constitute an 'error protocol' or 'error message'*". However, the Examiner has given no prior art support for his post hoc conclusion that an operator viewing an image of the workpiece and the tool on a display screen constitutes an error message. There is no indication whatsoever by Jansen et al. that an error message is generated. To the contrary, in the method according to Jansen et al., the human operator observes the computer modeled images of the workpiece and the tool "to check whether an interference will occur between the workpiece and the cutter tool during the machining" (abstract, col. 2 lines 30 to 34). From this, "the operator may determine if there is any contact between the workpiece and the cutter tool during the machining process" (col. 3 lines 24 to 26). The human operator deciding or determining if there is any contact, interference or collision between the cutter tool and the workpiece does not involve "generating an error message" in response to the automated comparison of the tool path with the collision contour if this automated comparison determines that a collision will occur according to the present invention. In the method of Jansen et al. there would have been no need for an error message, because the human operator himself or herself decides and determines the occurrence of a collision by visual observation of the computer generated images of the tool and the workpiece. Thus, this human step of viewing images of the tool and the workpiece and visually observing whether a collision occurs cannot be regarded as

"generating an error message" because there is no error message and there is no generation of any message of any kind.

Dependent claim 20 recites further particular details of how a collision contour may be defined. Particularly, a collision contour can be defined by moving the milling tool along and in contact with one of the edges of the component to be produced. The Examiner has not addressed this feature of claim 20 in the rejection. Jansen et al. do not disclose anything in this regard or along these lines. Instead, Jansen et al. disclose that the operator must input into the computer such information as the cutter tool shape and dimensions, the shape of the workpiece portion, the dimensional parameters of the milling machine, and the computer instructions for the machining process, and from this the CAD/CAM system will model the successive relative position of the cutter tool image and the workpiece image (col. 3 lines 16 to 24). That does not involve moving the milling tool along and in contact with an edge of the component to be produced in order to define the collision contour.

Present independent claim 21 is directed to a milling method that involves comparing a proposed tool path with a collision contour, and then if the proposed tool path is determined to cross the collision contour the method further involves generating a collision signal indicative of a collision, and in response to this collision signal revising the proposed tool path to thereby define a final tool path that will not cross the collision contour. The steps of generating a collision signal and then revising a proposed tool path to define a corrected final tool path in response to this collision signal are not

disclosed and would not have been suggested by Jansen et al. Also, the Examiner has not addressed these steps in the rejection.

Contrary to the present invention with the above features, Jansen et al. disclose that computerized images of the workpiece and the milling tool are simply displayed on a display screen, and a human operator visually observes whether an interference will occur between the workpiece and the milling tool. Based on this visual observation of the computer generated images of the tool and the workpiece, the human operator can then decide whether an interference will occur. Jansen et al. do not disclose what is then carried out. The method of Jansen et al. does not involve generating a collision signal, as discussed above. The method of Jansen et al. also does not involve revising a proposed tool path to thereby define a corrected (non-colliding) final tool path in response to such a collision signal.

Jansen et al. have nothing to do with generating a collision signal, but rather merely generating and displaying images of the tool and the workpiece on a display screen, for human visual observation. That's it. That's all. There is no step of generating a collision signal if a step of comparing a prosed tool path with a collision contour determines that the proposed tool path crossed the collision contour. In fact, there is not even a step of comparing a proposed tool path with a collision contour, but rather a visual observation of an image of the tool and an image of the workpiece.

Dependent claim 22 recites that the collision signal comprises an error message indicating to an operating personnel that the collision has been determined. Contrary thereto, in the method of Jansen et al., it is the operating personnel who determines if a collision will occur based on a visual observation of images of the tool and the workpiece. There is no error message that indicates to the operating personnel that a collision has been determined.

Dependent claim 25 recites that the step of defining the collision contour comprises moving the milling tool along and in contact with an edge of a sample model that has the desired milled shape of the milled component, so that the edge thereby defines the collision contour. As discussed above in connection with claim 20, the Jansen et al. reference does not disclose anything in this regard. The Examiner has also not addressed these features in the rejection.

For the above reasons, the present inventive features of claims 8 to 27 are not anticipated by, and would not have been obvious from, the disclosure of Jansen et al. The Examiner is respectfully requested to withdraw the rejection of claims 8 to 27 based on Jansen et al.

[RESPONSE CONTINUES ON NEXT PAGE]

9) Favorable reconsideration and allowance of the application, including all present claims 8 to 17, 19 to 23, 25, 27 and 28, are respectfully requested.

Respectfully submitted,

WFF:ks/4930
Enclosures:
Transmittal Cover Sheet
Replacement page of abstract

By Walter F. Fasse

Walter F. Fasse
Patent Attorney
Reg. No.: 36132
Tel. 207-862-4671
Fax. 207-862-4681
P.O. Box 726
Hampden, ME 04444-0726

CERTIFICATE OF FAX TRANSMISSION:

I hereby certify that this correspondence with all indicated enclosures is being transmitted by telefax to (571) 273-8300 on the date indicated below, and is addressed to: COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450.

Walter F. Fasse 6/30/09

Name: Walter F. Fasse - Date: June 30, 2009